

## NAREL AirBeta Batch Analysis

NAREL assay batch: 0017524L  
 G5000 batch: 0017524L-20131106155528  
 Instrument: PR01  
 Operator: Siddiqui, Nina S.  
 Background: 2013-11-06 07:31 CST 100.00 min  
     Alpha: 20 count(s) 0.20 cpm Within target range  
     Beta: 519 count(s) 5.19 cpm Within target range  
 Efficiencies: Alpha 0.3088(93) Beta 0.453(14)  
 Efficiency check: 2013-11-06 09:12 CST 10.00 min  
     Alpha: Within target range  
     Beta: Within target range  
 Data file: 0017524L-20131106155528.air

  
 11/16/13

Pos	Sample ID	Size	Unit	Fraction	
1	B3.10843X	4.17(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
2	B3.10844Y	7.20(36) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
3	B3.10845Z	5.85(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
4	B3.10846A	8.54(43) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
5	B3.10847B	8.54(43) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
6	B3.10848C	7.07(35) × 10 <sup>3</sup>	M <sup>3</sup>	1	
7	B3.10918Z	1.198(60) × 10 <sup>4</sup>	M <sup>3</sup>	1	> 5 d of sampling
8	B3.10919A	4.13(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
9	B3.10920T	2.80(14) × 10 <sup>3</sup>	M <sup>3</sup>	1	
10	B3.10921U	1.201(60) × 10 <sup>4</sup>	M <sup>3</sup>	1	> 5 d of sampling
11	B3.10924X	4.29(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
12	B3.10925Y	4.33(22) × 10 <sup>3</sup>	M <sup>3</sup>	1	
13	B3.10991J	8.79(44) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
14	B3.10992K	9.80(49) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
15	B3.10993L	6.05(30) × 10 <sup>3</sup>	M <sup>3</sup>	1	
16	B3.10994M	4.19(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
17	B3.10995N	4.33(22) × 10 <sup>3</sup>	M <sup>3</sup>	1	
18	B3.10996P	5.69(28) × 10 <sup>3</sup>	M <sup>3</sup>	1	
19	B3.10997Q	9.99(50) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
20	B3.10998R	4.17(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
21	B3.10999T	8.58(43) × 10 <sup>3</sup>	M <sup>3</sup>	1	> 5 d of sampling
22	B3.11000N	5.72(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
23	B3.11001P	4.20(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
24	B3.11002Q	4.29(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
25	B3.11003R	6.96(35) × 10 <sup>3</sup>	M <sup>3</sup>	1	
26	B3.11004T	4.27(21) × 10 <sup>3</sup>	M <sup>3</sup>	1	
27	B3.11005U	5.76(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
28	B3.11006V	3.93(20) × 10 <sup>3</sup>	M <sup>3</sup>	1	
29	B3.11007W	1.013(51) × 10 <sup>4</sup>	M <sup>3</sup>	1	> 5 d of sampling
30	B3.11008X	7.11(36) × 10 <sup>3</sup>	M <sup>3</sup>	1	
31	B3.11009Y	5.72(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
32	B3.11010Q	5.81(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
33	B3.11011R	5.81(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
34	B3.11012T	2.82(14) × 10 <sup>3</sup>	M <sup>3</sup>	1	
35	B3.11013U	2.84(14) × 10 <sup>3</sup>	M <sup>3</sup>	1	
36	B3.11014V	5.89(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
37	B3.11015W	3.89(19) × 10 <sup>3</sup>	M <sup>3</sup>	1	
38	B3.11016X	5.71(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
39	B3.11017Y	5.76(29) × 10 <sup>3</sup>	M <sup>3</sup>	1	
40	B3.11018Z	4.32(22) × 10 <sup>3</sup>	M <sup>3</sup>	1	

1	B3.10843X	$4.17(21) \times 10^3$	M <sup>3</sup>	1	
2	B3.10844Y	$7.20(36) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
3	B3.10845Z	$5.85(29) \times 10^3$	M <sup>3</sup>	1	
4	B3.10846A	$8.54(43) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
5	B3.10847B	$8.54(43) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
6	B3.10848C	$7.07(35) \times 10^3$	M <sup>3</sup>	1	
7	B3.10918Z	$1.198(60) \times 10^4$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
8	B3.10919A	$4.13(21) \times 10^3$	M <sup>3</sup>	1	
9	B3.10920T	$2.80(14) \times 10^3$	M <sup>3</sup>	1	
10	B3.10921U	$1.201(60) \times 10^4$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
11	B3.10924X	$4.29(21) \times 10^3$	M <sup>3</sup>	1	
12	B3.10925Y	$4.33(22) \times 10^3$	M <sup>3</sup>	1	
13	B3.10991J	$8.79(44) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
14	B3.10992K	$9.80(49) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
15	B3.10993L	$6.05(30) \times 10^3$	M <sup>3</sup>	1	
16	B3.10994M	$4.19(21) \times 10^3$	M <sup>3</sup>	1	
17	B3.10995N	$4.33(22) \times 10^3$	M <sup>3</sup>	1	
18	B3.10996P	$5.69(28) \times 10^3$	M <sup>3</sup>	1	
19	B3.10997Q	$9.99(50) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
20	B3.10998R	$4.17(21) \times 10^3$	M <sup>3</sup>	1	
21	B3.10999T	$8.58(43) \times 10^3$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
22	B3.11000N	$5.72(29) \times 10^3$	M <sup>3</sup>	1	
23	B3.11001P	$4.20(21) \times 10^3$	M <sup>3</sup>	1	
24	B3.11002Q	$4.29(21) \times 10^3$	M <sup>3</sup>	1	
25	B3.11003R	$6.96(35) \times 10^3$	M <sup>3</sup>	1	
26	B3.11004T	$4.27(21) \times 10^3$	M <sup>3</sup>	1	
27	B3.11005U	$5.76(29) \times 10^3$	M <sup>3</sup>	1	
28	B3.11006V	$3.93(20) \times 10^3$	M <sup>3</sup>	1	
29	B3.11007W	$1.013(51) \times 10^4$	M <sup>3</sup>	1	<b>&gt; 5 d of sampling</b>
30	B3.11008X	$7.11(36) \times 10^3$	M <sup>3</sup>	1	
31	B3.11009Y	$5.72(29) \times 10^3$	M <sup>3</sup>	1	
32	B3.11010Q	$5.81(29) \times 10^3$	M <sup>3</sup>	1	
33	B3.11011R	$5.81(29) \times 10^3$	M <sup>3</sup>	1	
34	B3.11012T	$2.82(14) \times 10^3$	M <sup>3</sup>	1	
35	B3.11013U	$2.84(14) \times 10^3$	M <sup>3</sup>	1	
36	B3.11014V	$5.89(29) \times 10^3$	M <sup>3</sup>	1	
37	B3.11015W	$3.89(19) \times 10^3$	M <sup>3</sup>	1	
38	B3.11016X	$5.71(29) \times 10^3$	M <sup>3</sup>	1	
39	B3.11017Y	$5.76(29) \times 10^3$	M <sup>3</sup>	1	
40	B3.11018Z	$4.32(22) \times 10^3$	M <sup>3</sup>	1	
41	RBK	1	SAMP	1	
42	RBK	1	SAMP	1	

Counted	min	Pos	Analysis	Sample ID	QC	α/β	Count	Net cpm	Result	Unit	Q	Warn
2013-11-06 15:56	20.0	9	00677222W	B3.10920T		α	20	0.80	4.2(12) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	869	38.26	1.361(96) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 16:16	20.0	32	00677285M	B3.11010Q		α	15	0.55	1.38(52) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1414	65.51	1.123(73) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 16:37	20.0	1	00676770R	B3.10843X		α	22	0.90	3.15(87) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	995	44.56	1.063(73) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 16:58	20.0	2	00676771T	B3.10844Y		α	9	0.25	5.1(33) × 10 <sup>-5</sup>	PCI/M <sup>3</sup>	D	
						β	818	35.71	4.94(35) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 17:18	20.0	3	00676772U	B3.10845Z		α	24	1.00	2.50(65) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1366	63.11	1.075(70) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 17:39	20.0	4	00676774W	B3.10846A		α	46	2.10	3.59(63) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	2269	108.26	1.263(79) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 17:59	20.0	5	00676776Y	B3.10847B		α	62	2.90	4.95(74) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	2891	139.36	1.62(10) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 18:20	20.0	6	00676778A	B3.10848C		α	19	0.75	1.55(48) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1073	48.46	6.82(46) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 18:41	20.0	7	00677219B	B3.10918Z		α	28	1.20	1.46(34) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	714	30.51	2.54(19) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 19:01	20.0	8	00677221V	B3.10919A		α	14	0.50	1.77(71) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	955	42.56	1.026(71) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 19:22	20.0	9	00678225D	B3.10920T	DUP	α	23	0.95	5.0(13) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	946	42.11	1.50(10) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 19:42	20.0	10	00677223X	B3.10921U		α	32	1.40	1.70(37) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	2412	115.41	9.57(59) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 20:03	20.0	11	00677226A	B3.10924X		α	18	0.70	2.38(77) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	862	37.91	8.80(62) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 20:24	20.0	12	00677228C	B3.10925Y		α	15	0.55	1.85(70) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	872	38.41	8.82(62) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 20:44	20.0	13	00677240Y	B3.10991J		α	57	2.65	4.40(69) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	2142	101.91	1.154(72) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 21:05	20.0	14	00677242A	B3.10992K		α	22	0.90	1.34(37) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1887	89.16	9.05(57) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 21:25	20.0	15	00677244C	B3.10993L		α	20	0.80	1.93(57) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1040	46.81	7.70(52) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 21:46	20.0	16	00677245D	B3.10994M		α	12	0.40	1.39(65) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1037	46.66	1.110(76) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 22:07	20.0	41	00678226E		RBK	α	2	-0.10	-1.5(14) × 10 <sup>-1</sup>	PCI/SAMID		
						β	95	-0.44	-4.4(58) × 10 <sup>-1</sup>	PCI/SAMP		
2013-11-06 22:27	20.0	17	00677247F	B3.10995N		α	12	0.40	1.35(63) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	965	43.06	9.91(68) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 22:48	20.0	18	00677249H	B3.10996P		α	13	0.45	1.15(50) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1197	54.66	9.56(64) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 23:09	20.0	19	00677251B	B3.10997Q		α	21	0.85	1.24(36) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1203	54.96	5.48(36) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-06 23:29	20.0	20	00677253D	B3.10998R		α	24	1.00	3.50(91) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	1478	68.71	1.64(11) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-06 23:50	20.0	21	00677255F	B3.10999T		α	41	1.85	3.14(59) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	3417	165.66	1.92(12) × 10 <sup>-2</sup>	PCI/M <sup>3</sup>		
2013-11-07 00:10	20.0	22	00677256G	B3.11000N		α	14	0.50	1.28(51) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	555	22.56	3.93(31) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-07 00:31	20.0	23	00677258J	B3.11001P		α	9	0.25	8.7(57) × 10 <sup>-5</sup>	PCI/M <sup>3</sup>	D	
						β	837	36.66	8.70(62) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		
2013-11-07 00:52	20.0	24	00677260C	B3.11002Q		α	11	0.35	1.19(61) × 10 <sup>-4</sup>	PCI/M <sup>3</sup>	D	
						β	528	21.21	4.93(40) × 10 <sup>-3</sup>	PCI/M <sup>3</sup>		

2013-11-07 01:12	20.0	25	00677271F	B3.11003R	$\alpha$	24	1.00	$2.10(55) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
2013-11-07 01:33	20.0	26	00677273H	B3.11004T	$\beta$	1037	46.66	$6.68(45) \times 10^{-3}$	PCI/M <sup>3</sup>	
2013-11-07 01:54	20.0	27	00677275K	B3.11005U	$\alpha$	10	0.30	$1.02(59) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
2013-11-07 02:14	20.0	28	00677277M	B3.11006V	$\beta$	611	25.36	$5.91(46) \times 10^{-3}$	PCI/M <sup>3</sup>	
2013-11-07 02:35	20.0	29	00677279P	B3.11007W	$\alpha$	17	0.65	$1.65(56) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
2013-11-07 02:55	20.0	30	00677281H	B3.11008X	$\beta$	1090	49.31	$8.52(58) \times 10^{-3}$	PCI/M <sup>3</sup>	
2013-11-07 03:16	20.0	31	00677283K	B3.11009Y	$\alpha$	821	0.65	$2.41(82) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
2013-11-07 03:37	20.0	32	00678227F	B3.11010Q	DUP	41	1.85	$2.67(50) \times 10^{-4}$	PCI/M <sup>3</sup>	
2013-11-07 03:57	20.0	42	00678228G	RBK	$\beta$	2229	106.26	$1.045(65) \times 10^{-2}$	PCI/M <sup>3</sup>	
2013-11-07 04:18	20.0	33	00677287P	B3.11011R	$\alpha$	32	0.90	$1.85(51) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
2013-11-07 04:39	20.0	34	00677289R	B3.11012T	$\beta$	1373	63.46	$8.89(58) \times 10^{-3}$	PCI/M <sup>3</sup>	
2013-11-07 04:59	20.0	35	00677291K	B3.11013U	$\alpha$	16	1.40	$3.57(77) \times 10^{-4}$	PCI/M <sup>3</sup>	
2013-11-07 05:20	20.0	36	00677293M	B3.11014V	$\beta$	1501	69.86	$1.215(79) \times 10^{-2}$	PCI/M <sup>3</sup>	
2013-11-07 05:40	20.0	37	00677295P	B3.11015W	$\alpha$	16	0.60	$1.51(54) \times 10^{-4}$	PCI/M <sup>3</sup>	
2013-11-07 06:01	20.0	38	00677297R	B3.11016X	$\beta$	1386	64.11	$1.099(72) \times 10^{-2}$	PCI/M <sup>3</sup>	
2013-11-07 06:22	20.0	39	00677299U	B3.11017Y	$\alpha$	22	0.00	$0.0(18) \times 10^{-1}$	PCI/SAMID	
2013-11-07 06:42	20.0	40	00677301U	B3.11018Z	$\beta$	1066	-0.04	$-4(60) \times 10^{-2}$	PCI/SAMP	
					$\alpha$	14	0.90	$2.26(63) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	720	48.11	$8.24(56) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	16	0.50	$2.6(10) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	387	30.81	$1.087(80) \times 10^{-2}$	PCI/M <sup>3</sup>	
					$\alpha$	16	0.60	$3.1(11) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	25	14.16	$4.96(46) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	25	0.05	$2.60(66) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	1109	50.26	$8.49(57) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	10	0.30	$1.13(65) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	380	13.81	$3.54(33) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	18	0.70	$1.79(58) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	594	24.51	$4.27(33) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	17	0.65	$1.65(56) \times 10^{-4}$	PCI/M <sup>3</sup>	<b>D</b>
					$\beta$	1096	49.61	$8.58(58) \times 10^{-3}$	PCI/M <sup>3</sup>	
					$\alpha$	33	1.45	$4.9(10) \times 10^{-4}$	PCI/M <sup>3</sup>	
					$\beta$	1247	57.16	$1.316(87) \times 10^{-2}$	PCI/M <sup>3</sup>	<b>D</b>

Reviewed by: \_\_\_\_\_

Date: 11/17/2013

**National Air and Radiation Environmental Laboratory  
QC Batch Report**

QC Batch #: 0010474D

Analytical Method: AIRBETA

**METHOD BLANKS (PCI)**

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00678226E	BETA	-4.38e-01 $\pm$ 1.2e+00	2013-11-06	OK

**LABORATORY DUPLICATES (PCI/M3)**

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B3.10920T	BETA	1.36e-02 $\pm$ 1.9e-03	1.50e-02 $\pm$ 2.1e-03	9.58	0.97 OK

Analyst:

*M. Liu*

*11/7/13*

QA Officer:

*GTR-White (AIT/QAO)*

*11-7-13*

*Apr*

**National Air and Radiation Environmental Laboratory**  
**QC Batch Report**

QC Batch #: 0010475E

Analytical Method: AIRBETA

**METHOD BLANKS (PCI)**

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00678228G	BETA	-3.98e-02 $\pm$ 1.2e+00	2013-11-06	OK

**LABORATORY DUPLICATES (PCI/M3)**

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B3.11010Q	BETA	1.12e-02 $\pm$ 1.5e-03	1.10e-02 $\pm$ 1.4e-03	2.16	-0.23 OK

Analyst:

R. L. White

11/7/13

QA Officer:

GRL White (AHQAO)

11-7-13

for

Method Blanks

Analyte: BETA

Method: AIRBETA

Analyst: Siddiqui, Nina S.

